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SCROTAL MIGRATION OF THE DISTAL END OF VENTRICULOPERITONEAL SHUNT IN AN INFANT: A RARE CASE REPORT AND LITERATURE REVIEW

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ABSTRACT This case highlights the importance of early recognition of scrotal migration, timely surgical intervention, and consideration of preventive measures such as repair of an associated hernia or patent processus vaginalis during initial shunt placement.

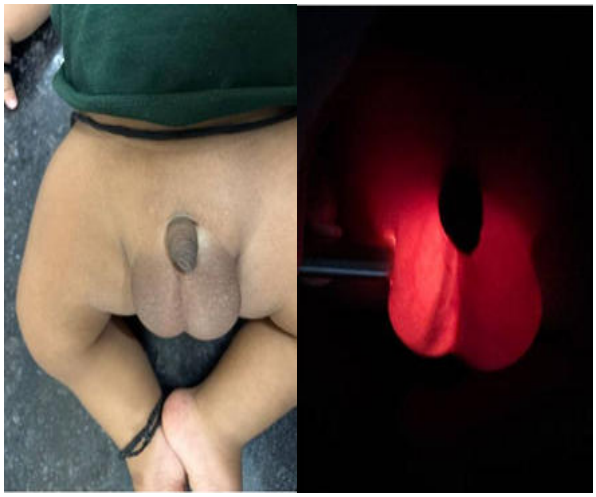
KEYWORDS : Ventriculoperitoneal Shunt, Scrotal Migration, Patent Processus Vaginalis, Pediatric Neurosurgery, Hydrocephalus

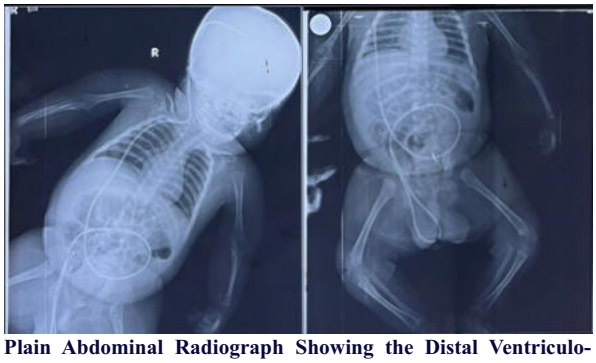
INTRODUCTION

Ventriculoperitoneal (VP) shunting remains the most common surgical treatment for hydrocephalus. Although the procedure is generally effective, it is associated with a range of complications including obstruction, infection, and migration of the catheter. Distal migration into the scrotum is extremely rare and is primarily seen in infants due to the persistence of the processus vaginalis. Fewer than 50 cases have been reported in the literature [1,2]. We present a case of scrotal migration of the VP shunt in a 6-month-old male infant and provide a literature review to discuss the pathophysiology, diagnosis, and management strategies.

Case Presentation

A 6-month-old male infant with congenital hydrocephalus underwent right-sided VP shunt placement at 2 months of age. The early postoperative course was uneventful. Four months later, the mother observed a gradually enlarging, non-tender swelling in the right hemiscrotum. There was no associated fever, irritability, or feeding difficulty. On examination, a soft mass with a cord-like structure consistent with shunt tubing was palpable within the scrotum. Both testes were normally positioned. Abdominal examination was unremarkable, and laboratory investigations were within normal limits. A plain abdominal and pelvic radiograph demonstrated the distal catheter coiled in the right scrotal sac. Surgical revision was performed through a right inguinal approach. Intraoperatively, CSF flow and shunt function were confirmed before the distal catheter was repositioned into the peritoneal cavity, and the patent processus vaginalis was ligated. The postoperative recovery was smooth, and the patient was discharged on the fourth postoperative day with a functioning shunt.





Plain Abdominal Radiograph Showing the Distal Ventriculo-peritoneal Shunt Catheter Coursing Through the Right Inguinal Canal into the Scrotum

DISCUSSION

A 2021 systematic review identified 48 pediatric cases of scrotal migration and emphasized repair of an associated hernia or patent processus vaginalis at the time of revision [9]. More recent case reports likewise advocate early recognition and combined herniotomy with shunt repositioning to prevent recurrence [10,11]. Population-based data also show a heightened risk of inguinal hernia after VP shunt in young children, with an overall incidence of ~22.9 per 1,000 person-years and the greatest risk in neonates and infants [12]. Ultrasound can assist when physical findings are equivocal; pediatric series report high diagnostic accuracy for detecting a patent processus vaginalis [13].

Ventriculoperitoneal shunting is the most widely used treatment for hydrocephalus, though it is associated with complications including obstruction, disconnection, infection, over-drainage, visceral perforation, and distal catheter migration. Distal migration into the scrotum is extremely rare, occurring primarily in infants due to the persistence of a patent processus vaginalis. This embryological remnant allows communication between the peritoneal cavity and the scrotum, enabling the catheter to herniate. Contributing factors include increased intra-abdominal pressure from CSF drainage, short catheter length, and thin abdominal musculature. Reported consequences include shunt malfunction, infection, and rarely, testicular compromise. At one year of age, the processus vaginalis remains patent in up to 60% of infants, and the presence of a VP shunt may prolong its patency [6]. There is an increased incidence of hernia and hydrocele in VP shunt patients compared with the general pediatric population [6,7]. Diagnosis is usually clinical and confirmed by imaging such as radiographs or ultrasonography. Standard management involves surgical revision with repositioning of the distal catheter and high ligation of the processus vaginalis to prevent recurrence. Some authors recommend prophylactic closure of a patent

processus vaginalis during initial VP shunt placement in infants.

Diagnosis is typically clinical and confirmed by imaging such as plain radiographs or ultrasonography. Standard management involves surgical revision, repositioning of the distal catheter, and high ligation of the processus vaginalis to prevent recurrence. Some authors recommend prophylactic closure of a patent processus vaginalis during initial VP shunt placement in infants to minimize risk.

Scrotal migration of a VP shunt is rare, with the majority of cases occurring in infants due to the persistence of the processus vaginalis. This embryological remnant allows communication between the peritoneal cavity and the scrotum, facilitating distal catheter migration. Increased intra-abdominal pressure from cerebrospinal fluid drainage, short catheter length, and thin abdominal musculature in infants are contributory factors. Complications of migration in scrotum include shunt malfunction, infection, and, rarely, testicular compromise.

Literature Review

Most reported cases present within the first postoperative year, consistent with our patient. Outcomes are generally favorable following revision and closure of the processus vaginalis. Preventive strategies—including laparoscopic placement and prophylactic closure of a patent processus vaginalis—have been proposed to reduce recurrence [1,5,9,11].

CONCLUSION

Scrotal migration of a VP shunt is a rare but important complication that should be considered in infants presenting with new scrotal swelling after shunt surgery. Early recognition and prompt surgical intervention are essential to avoid shunt malfunction and potential testicular compromise. Routine assessment and, when indicated, closure of a patent processus vaginalis at the time of initial shunt placement may serve as an effective preventive strategy.

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